

**BRIEF FUNCTIONAL ASSESSMENT TECHNIQUES TO EVALUATE  
ABERRANT BEHAVIOR IN AN OUTPATIENT SETTING:  
A SUMMARY OF 79 CASES**

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Previous investigators have analyzed the maintaining conditions for aberrant behaviors using brief functional assessment procedures. These assessment procedures have been used in one of our outpatient clinics, the Self-Injurious and Aggressive Behavior Service. This study presents a descriptive summary of the results from 79 cases during a 3-year period. The outcomes of the brief assessment were evaluated across three variables: (a) referring topography, (b) control over behavior as evaluated through brief multielement designs, and (c) the identified maintaining conditions for aberrant behavior. The limitations and future utility of brief functional assessments for identifying distinct maintaining contingencies are discussed.

**DESCRIPTORS:** brief functional assessment, self-injurious behavior, severely handicapped, outpatient setting

During the last 3 years, we have developed an outpatient service for use with developmentally disabled clients, aged 12 months to 35 years, who display self-injurious, aggressive, stereotypic, and other forms of aberrant behavior (see Wacker & Steege, in press, for a more complete description of the clinic). One goal for this clinic was to adapt the functional analysis procedures described by Carr and Durand (1985) and Iwata, Dorsey, Slifer, Bauman, and Richman (1982) to the 90-min time limit scheduled for outpatient clinic evaluations. Within this 90-min time frame, we wanted to conduct direct assessments of aberrant behavior under varied conditions for the purpose of treatment identification (Iwata, 1987). To adapt functional analysis procedures to our time limitations, we used single data point, multielement designs across potential maintaining conditions (i.e., alone, escape,

attention, demand, or tangible) with an initial and replication phase of assessment. During replication, the "best" and "worst" conditions—those conditions resulting in either the most or fewest occurrences of aberrant target behavior—were repeated. Variations of this approach have also been used (Wacker & Steege, in press).

Preliminary applications of this outpatient model were encouraging for clients with severe disabilities (Northup et al., 1991) and children of average abilities (Cooper, Wacker, Sasso, Reimers, & Donn, 1990) who displayed severe behavior problems. Distinct maintaining conditions for target behaviors were identified for most children. Our modified functional analysis procedures adapted to the confines of an outpatient clinic have been successful enough to warrant further evaluation. Equally important, we have attempted to develop this assessment technology in a systematic and replicable fashion. Thus, after our initial evaluations of the assessment approach (Cooper et al., 1990; Northup et al., 1991), the next logical step was to conduct a large-scale clinical replication with our clinic population to advance the technology in terms of its generalizability across subjects and target behaviors (Mace, 1991).

The purpose of this study was to conduct a descriptive summary of 79 cases evaluated with brief functional assessments over the first 3 years

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of the Self-Injurious and Aggressive Behavior Service (1987 to 1990). The data presented here represent the findings obtained from these 79 cases; no clients were excluded.

The primary question for the present investigation was: For what percentage of clients did a brief functional assessment identify specific maintaining conditions for aberrant behavior? Our secondary question was: What percentage of clients showed a decrease in aberrant behavior, with a subsequent increase in alternative behavior, when the maintaining contingencies identified for aberrant behavior were applied to appropriate behavior? If a maintaining contingency was identified, and if that same contingency could be used to improve appropriate behavior, then a key treatment goal (Hayes, Nelson, & Jarrett, 1987) would have been at least partially satisfied. The 79 completed assessments available for inspection appeared to be an adequate sample for the purposes of evaluating the generalizability (clinical replication) and applicability (treatment utility) of the procedures. Thus, a third and final question for this evaluation involved the overall extent to which the assessment procedures were replicable across clients, clinical staff, and response topographies.

## METHOD

### *General Clinic Procedures*

All assessments were conducted in a classroom at the Division of Developmental Disabilities in the Department of Pediatrics at The University of Iowa. The classroom was equipped with a one-way mirror permitting unobtrusive observation. The outpatient clinic was staffed with two faculty-level applied behavior analysts (a pediatric psychologist and a special educator) with support services provided by undergraduate students, graduate students, and a certified teacher. Over the course of this evaluation, the two faculty members (second and third authors) remained the same. However, most other staff and students changed, usually on a semester-by-semester basis.

All clinic evaluations were planned during a

morning staff meeting in which members of the clinic team reviewed each client's history. Hypotheses about maintaining conditions were generated from both historical data and the completion of the Motivation Assessment Scale (Durand & Crimmins, 1988) by care providers prior to the evaluation.

*Direct observation.* After the morning meeting, between 1 and 4 clients were evaluated that day. Ninety minutes were allocated for each evaluation, which typically involved direct observation of client behavior during prespecified conditions. The conditions used for the assessment varied based on the hypothesis, but the assessment was usually conducted in two phases. During Phase 1, initial assessment contingencies were provided for aberrant behavior, based on the work by Carr and Durand (1985) and Iwata *et al.* (1982). During Phase 2, replication of the initial assessment was conducted. In most cases, a contingency reversal was implemented (Northup *et al.*, 1991) in which the contingencies maintaining aberrant behavior in Phase 1 were provided for an alternative response. If behavior displayed undifferentiated responding during initial assessment evaluations, a training phase was completed in which the evaluators increased appropriate responding. In almost all cases, a parent or care provider worked with clinic staff as the "therapist" in applying the contingencies during the assessment.

*Design of evaluation.* An example of a typical assessment is provided in the top panel of Figure 1. For this client, the hypothesis was that adult attention maintained (i.e., positively reinforced) self-injury. The assessment began with an alone condition, followed by attention for self-injury, escape from task for self-injury, and attention for self-injury. The order of these conditions was arranged to form a brief multielement design and, as shown, self-injury appeared to be maintained by attention. During Phase 2, manding "please" was selected as the appropriate target behavior, and a second multielement analysis was conducted with comparable results (attention was provided for manding and withheld for self-injury). We concluded from these

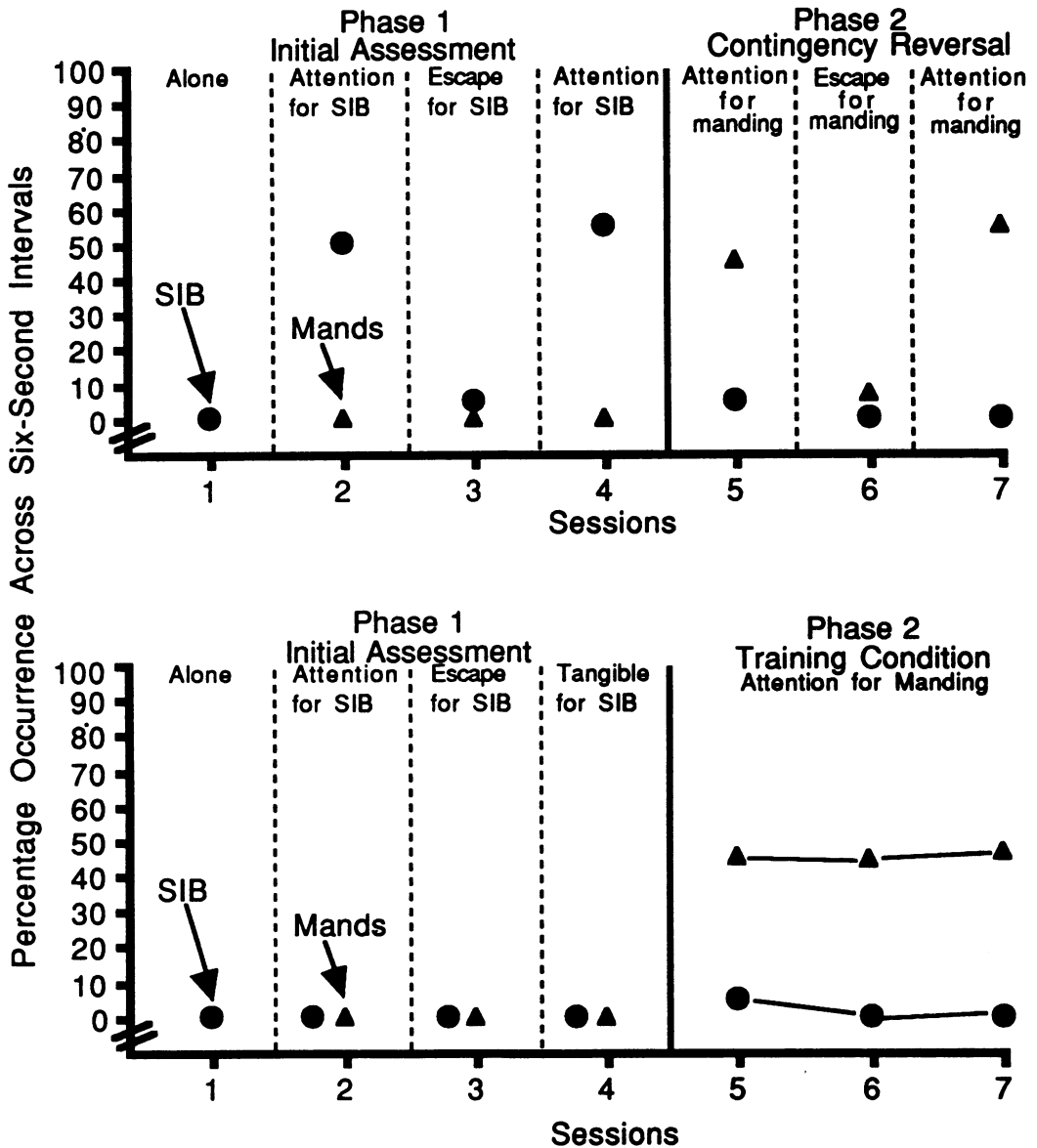


Figure 1. An example of the model assessment, including both an initial and a contingency-reversal assessment phase, is provided in the top panel. The bottom panel shows an example of training appropriate manding following an unsuccessful functional analysis of self-injury.

results that both self-injury and appropriate communication were maintained by adult attention, at least within the context of the assessment.

**Observation.** Each assessment condition in Figure 1 lasted 10 min, which is typical of our outpatient assessments. During the assessment, two independent observers concurrently recorded oc-

currence/nonoccurrence data on both client and staff behaviors on 100% of the intervals using a 6-s partial-interval recording system. Similar data were collected on other clients, with agreement calculated for over 50% of all intervals for all clients.

**Clinic protocols.** The assessment protocols varied among the clients for three reasons. First, the

conditions selected depended on hypotheses generated at the morning staff meeting, but almost all evaluations involved alone, escape, and attention conditions during the initial assessment phase. Second, some of the clients did not display aberrant behavior, or the aberrant behavior was so severe that tissue damage was considered probable. In these cases, the focus of assessment was on appropriate behavior during the initial assessment and was followed by training the care providers to implement the treatment protocol for reducing aberrant behavior. In addition, we developed an assessment protocol for stereotypic behaviors that was used almost exclusively for those clients whose behavior was hypothesized to serve a sensory function. This protocol assessed stereotypy during various sensory conditions (e.g., music and vibration) along with the alone, escape, and attention conditions.

### *Summary Preparation*

The results of each evaluation were plotted as shown in the top panel of Figure 1. Two examiners visually inspected the data to identify whether a specific independent variable appeared to function as a reinforcer for the target behavior. Given the absence of time series data, reinforcers were identified based on their relative effects when compared to the effects of other potential reinforcers assessed during adjacent conditions. To be defined as a reinforcer, the relative magnitude of difference in target behavior in different conditions needed to be greater than 10%, the effect on behavior needed to be replicated as shown in Conditions 2 and 4 in the top panel of Figure 1, and there had to be an alternative nonreinforcing condition inserted between the two reinforcement conditions. As shown in the top panel of Figure 1, neither the alone nor the escape condition produced self-injury, but whenever attention was provided, self-injury occurred during at least 60% of the intervals. Further, the occurrence of self-injury varied as a function of the independent variable in effect, with no overlap occurring between the attention conditions and the remaining conditions. When a contingency reversal was conducted, further replication showed that at-

tention was a reinforcer for manding as well as for self-injury.

When aberrant behavior did not occur, as shown in the bottom panel of Figure 1, we conducted a limited training series to determine whether a reinforcer could be identified for an alternative behavior. Several 10-min sessions (at least three) were conducted to determine whether an alternative response, in this case manding, could be reliably increased by 10% or more with a hypothesized reinforcer. If this occurred, we concluded that a reinforcer had been identified for the appropriate target response but not for the aberrant behavior.

After the graphs were analyzed, the written summary indicated that (a) increases in aberrant behavior occurred in at least one condition (e.g., attention, see top panel of Figure 1), (b) decreases in aberrant behavior occurred when that variable was differentially provided for manding (top panel), or (c) increases in manding, but no increase in aberrant behavior, occurred during any of the assessment conditions (bottom panel). If no change in either aberrant or alternative behavior occurred, we summarized the results as being "inconclusive." Aberrant behavior occurred or did not occur, but in either case, the independent variables assessed did not appear to affect responding.

Thus, we classified the results of assessment as resulting in an increase in both aberrant and an alternative behavior, an increase in aberrant behavior only, an increase in appropriate behavior only, or inconclusive. This summary statement was included in the report and was reviewed for accuracy by one of the clinic directors (second or third author).

### *Subjects*

Subjects were those clients evaluated by the Self-Injurious and Aggressive Behavior Service, Department of Pediatrics, The University of Iowa, between 1987 and 1990. Shortly after the outpatient service was initiated, a comprehensive file was developed that contained initial assessment summaries for 83 outpatients. Brief assessments were not completed during four of these evalua-

tions, so these assessments were excluded from the present study. The clients consisted of 46 males (58%) and 33 females (42%). Average age of the clients was 14 years 7 months, and ranged from 1 year 5 months to 32 years 4 months. The diagnosed levels of mental retardation were as follows: mild (5%), moderate (14%), severe to profound (52%), and unspecified (31%). Over 30% had a diagnosed seizure disorder, and 20% had a sensory disability or a fixed motor disorder (e.g., cerebral palsy). Approximately 10% were diagnosed with autism.

### *Procedures and Response Definitions*

The first author reviewed all outpatient summaries and classified assessment outcomes using a data collection form developed for the investigation. Categories were not mutually exclusive. In coding the results, the first decision concerned the occurrence/nonoccurrence of aberrant behavior. These outcomes were then calculated across both topography and function of behavior. Calculations consisted of dividing the number of clients (based on either topography or function) by the number of clients for whom a brief functional assessment was attempted. In other words, the number of clients with a defined outcome for topography or function was divided by the number of clients that displayed the specified topography or function. Recordings were conducted for the following variables (see sample calculations below).

**Response topography.** Target aberrant behaviors were identified from each client's historical information. Self-injury was defined as any behavior resulting in self-inflicted tissue damage. Aggression was defined as any behavior that could result in injury to others, including kicking, punching, biting, and scratching. Stereotypic behavior was defined as any repetitive, nonadaptive motor behavior. Other behaviors included destruction, defined as any behavior resulting in property damage. To determine the percentage of clients that displayed a specific topography, the number of clients that presented each topography was divided by 79.

**Function of aberrant behavior.** The operant functions of the aberrant behavior were identified

in the treatment outcome section of the outpatient summary. To determine the percentage of clients displaying a specific function, the number of clients that presented each function was divided by 79.

**Aberrant target behavior displayed in clinic.** This was coded when the client displayed an aberrant target behavior (e.g., self-injury, aggression, etc.) at least once during the brief functional assessment. To determine the percentage of the sample displaying aberrant behavior, the number of clients displaying the target behavior was divided by 79.

**Aberrant behavior did not vary across conditions.** This was coded when the aberrant target behavior occurred across all conditions (i.e., the percentage interval occurrence differentiated  $\leq 10\%$  across conditions). To determine the percentage of its occurrence, the number of clients displaying this undifferentiated pattern was divided by 79.

**Assessments in which specific contingencies were found to increase aberrant behavior.** This was coded when a distinct condition was identified as resulting in a higher percentage of aberrant behavior than any other condition. A typical statement identifying this outcome in the outpatient summary was, "The client completed the following conditions: (a) alone, (b) attention, and (c) escape. During these initial assessment conditions, the client displayed the highest frequency of problematic behavior within the attention condition." The typical pattern supporting this statement is shown in the initial assessment data in the top panel of Figure 1. Percentage of occurrence was determined by dividing the number of clients displaying this outcome by the total subject sample who displayed aberrant behavior across topography and function. For example, if 27 subjects displayed aggression during the assessment, and specific contingencies were found to increase this behavior during 22 of the evaluations, the computation would be  $22/27 = 81\%$ .

**Assessments in which the aberrant behavior decreased.** This was coded when a contingency provided for an appropriate response resulted in a decrease in aberrant behavior. This outcome was

Table 1  
Outcomes of Brief Functional Analysis across Topographies

	Referral behaviors <sup>a</sup>				
	Aggres- sion	Self- injury	Stereo- typy	Other <sup>b</sup>	Total <sup>c</sup>
	61%	77%	24%	24%	95%
	<i>n</i> = 48	<i>n</i> = 61	<i>n</i> = 19	<i>n</i> = 19	<i>n</i> = 79
Abberant target behavior displayed (Phase 1)	56%	70%	89%	58%	63%
	<i>n</i> = 27	<i>n</i> = 43	<i>n</i> = 17	<i>n</i> = 11	<i>n</i> = 50
Distinct maintaining condition was identified during initial assessment (Phase 1)	81%	77%	71%	91%	74%
	<i>n</i> = 22	<i>n</i> = 33	<i>n</i> = 12	<i>n</i> = 10	<i>n</i> = 37
Abberant behavior decreased (Phase 2)	67%	49%	41%	45%	54%
	<i>n</i> = 18	<i>n</i> = 21	<i>n</i> = 7	<i>n</i> = 5	<i>n</i> = 27
Control of aberrant target behavior through environmental contingencies (Phase 1 or 2)	89%	84%	76%	91%	84%
	<i>n</i> = 24	<i>n</i> = 36	<i>n</i> = 13	<i>n</i> = 10	<i>n</i> = 42
Increases in appropriate behavior without changes in aberrant behavior	57%	72%	100%	50%	65%
	<i>n</i> = 12	<i>n</i> = 13	<i>n</i> = 2	<i>n</i> = 4	<i>n</i> = 19
Behavior change within the 90-min evaluation (Phase 1 or 2)	75%	80%	79%	74%	77%
	<i>n</i> = 36	<i>n</i> = 49	<i>n</i> = 15	<i>n</i> = 14	<i>n</i> = 61

<sup>a</sup> Many clients presented multiple behaviors; therefore, total exceeds total sample.  
<sup>b</sup> Includes destruction and loud vocalizations.  
<sup>c</sup> Functional analysis techniques were not used in four of the evaluations surveyed and were not included.

recorded if the outpatient summary identified the appropriate behavior that was increased and the contingencies that were used. A typical statement identifying this outcome was, “Following the initial assessment, the client was provided with attention for signing ‘please,’ resulting in an increase in signing and a concurrent decrease in self-injury.” The pattern of data needed to make this statement is shown in the contingency reversal section of the top panel of Figure 1. Percentage of occurrence was determined by dividing the number of these clients by the total subject sample that displayed aberrant behaviors across topography and function.

*Appropriate behavior increased but no change occurred in aberrant behavior.* This was coded when no aberrant behaviors were displayed or the aberrant behavior was undifferentiated across initial assessment conditions and the only observed change was for appropriate behavior. Typical outpatient summaries reported that no occurrences of aberrant behavior were observed or that manipulation of the aberrant behavior was not successful. In addition, the summary contained a description of a training

condition in which appropriate behaviors were increased. A typical data pattern for this outcome is shown in the training section of the bottom panel of Figure 1. Percentage of occurrence was determined by dividing the number of clients with this outcome by the total subject sample that failed to display changes in aberrant behavior.

*Interobserver Agreement*

A second investigator reviewed 29 of the 79 outpatient evaluation summaries. At the time of the investigation, she was enrolled in a graduate course in behavioral assessment but had no previous experience in the Self-Injurious and Aggressive Behavior Service. To compute agreement, both investigators independently recorded the outcomes described previously: topographies presented, display of aberrant behavior, identified maintaining contingencies, functions, and increases in appropriate behavior without changes in aberrant behavior. An agreement was recorded only if the same outcome was recorded by both raters. Agreements were calculated by dividing agreements by agree-

Table 2  
Outcomes of Brief Functional Analysis across Functions of Behavior

	Hypothesized maintaining conditions <sup>a</sup>			
	Escape	Sensory	Attention	Tangible
	48%	34%	24%	12%
	<i>n</i> = 38	<i>n</i> = 27	<i>n</i> = 19	<i>n</i> = 9
Aberrant target behavior displayed (Phase 1)	73%	70%	79%	66%
	<i>n</i> = 28	<i>n</i> = 19	<i>n</i> = 15	<i>n</i> = 6
Distinct maintaining condition was identified during initial assessment (Phase 1)	82%	63%	80%	83%
	<i>n</i> = 23	<i>n</i> = 12	<i>n</i> = 12	<i>n</i> = 5
Aberrant behavior decreased (Phase 2)	61%	47%	53%	66%
	<i>n</i> = 17	<i>n</i> = 9	<i>n</i> = 8	<i>n</i> = 4
Control of aberrant target behavior through environmental contingencies (Phase 1 or 2)	86%	74%	93%	100%
	<i>n</i> = 24	<i>n</i> = 14	<i>n</i> = 14	<i>n</i> = 6
Increases in appropriate behavior without changes in aberrant behavior (Bottom Panel)	50%	63%	50%	33%
	<i>n</i> = 5	<i>n</i> = 5	<i>n</i> = 2	<i>n</i> = 1
Behavior change within the 90-min evaluation (Phase 1 or 2)	76%	70%	84%	77%
	<i>n</i> = 29	<i>n</i> = 19	<i>n</i> = 16	<i>n</i> = 7

<sup>a</sup> Many clients presented multiple behaviors and multiple hypotheses were made; thus the data presented in the first row do not equal 100%.

ments plus disagreements. Overall interobserver agreement was 89.7%; the range of agreement by category was 87% to 100%.

## RESULTS

The results of the brief functional assessments across topographies are presented in Table 1. The number and percentage of clients displaying each topography are presented in the top row. In the total sample, 63% of the clients displayed one or more aberrant behaviors during the 90-min evaluation. When a target behavior was displayed, a distinct maintaining condition was identified during the initial assessment conditions 74% of the time. The implementation of a contingency for appropriate behavior resulted in the decrease of aberrant behavior during 54% of the evaluations. After an aberrant target behavior was displayed, the manipulation of contingencies resulted in behavioral control (reversal) during 84% of the evaluations completed. When the assessment focused only on appropriate behavior, 65% resulted in an increase in appropriate behavior, with the most common response being a manding response. Overall, a

change in either aberrant or appropriate behavior occurred for 77% of the evaluations.

Results were similar across topographies. However, a substantially higher percentage of clients (89%) displayed stereotypic behavior than any other topography. Clients referred for aggression displayed the lowest percentage (56%) of aberrant behavior during assessment.

Similar calculations for function of aberrant behavior are shown in Table 2. When the maintaining conditions for aberrant behavior were not identified, those clients (*n* = 6) were deleted from Table 2. The percentage of clients for each function is provided in the top row, with the major outcomes provided in subsequent rows. As shown in Row 2, maintaining conditions were identified at least 66% of the time across all functions, with behavioral change (last row) occurring for at least 77% of the clients across functions.

## DISCUSSION

A brief functional assessment was attempted for the 79 clients. A distinct maintaining condition for aberrant target behavior was identified in most cases

when aberrant behavior was observed, supporting the general utility of the procedures for the majority of referred clients. However, aberrant behavior occurred in only 63% of the cases. These results suggest that a major limitation of the brief functional assessment procedure is that it appears to be limited to clients who engage in high-frequency behavior in the clinic setting. The brief assessment procedures might be best considered as constituting a "reinforcer" probe. As such, a relatively stable and frequent aberrant behavior must be displayed for us to probe reliably for reinforcers.

Like Rogers, Zarcone, and Iwata (1990), we view the brief assessment as being valid when it closely approximates the results of an extended assessment. It makes intuitive sense that the probes more closely approximate the results of extended assessments when a steady and frequent occurrence of the aberrant target behavior is displayed in the clinic. A recent comparison study (Rogers *et al.*, 1990) suggested that although the brief assessments are preferable to indirect assessments, they are not as accurate as extended assessments of the type reported by Iwata *et al.* (1982). Until more of these comparison studies are conducted, perhaps the best way to evaluate these brief assessments is to view them as being primarily hypothesis-generating methods; they provide an empirical, direct means for developing hypotheses. Once developed, ongoing assessment or treatment might be used to specify the treatment further (Cooper, 1990), or repeated evaluations in the outpatient clinic might be needed to verify the results (Northup *et al.*, 1991). However, as discussed by Wacker, Northup, and Cooper (1992) and Rogers *et al.* (1990), brief functional assessments are preferred over the indirect measures (checklists or surveys) typically used in outpatient settings, because they lower the degree of inference needed to identify maintaining contingencies (and thus treatments). The inclusion of the replication phase adds to the experimental rigor of the assessments and increases the overall validity of the results.

If the target behavior was displayed, change in that behavior usually occurred during assessment. The utility of the evaluation, defined as the iden-

tification of a specific class of treatments, was at least partially substantiated for 77% of the evaluations (a change in either aberrant or appropriate behavior) if an aberrant was displayed.

Our intent in developing brief functional assessments was to conduct outpatient evaluations that approximated the functional analysis procedures described by Carr and Durand (1985) and Iwata *et al.* (1982). The first step, in our view, was to conduct single-case analyses of the procedures (Cooper *et al.*, 1990; Northup *et al.*, 1991) to demonstrate the potential utility of these types of evaluations. The second step was to evaluate applicability across a relatively large number of clients. This study was our initial attempt at this latter step. The results indicate that the procedures are replicable and generalizable to a large portion of the developmentally delayed population if aberrant behavior occurs at a high frequency.

We believe the results of this initial descriptive study further encourage the use of this assessment methodology in outpatient settings. Given that much of the work done in hospital settings is conducted in outpatient clinics, these findings are reassuring. However, as with any descriptive study, many more questions remain. In addition to the validity of the assessments, we are concerned about the relatively low percentage of clients who displayed aberrant behavior during the assessments. This occurrence does not seem to be related systematically to age, IQ, topography, or function. More work is needed to identify the conditions under which target behaviors are displayed during brief assessments.

We are also concerned about the high degree of control we believe is needed to conduct valid brief assessments. To be most useful, specific prompting procedures, schedules of reinforcement, and other variables must be defined as completely as possible. Although these parameters are also important in more extended evaluations, "errors" in administration are better accounted for in extended evaluations by analyzing within-condition trends. By having only a single data point per condition, spurious results may occur more often unless complete specification of each condition is conducted.



The results suggest that brief, modified versions of functional analyses can be conducted in outpatient settings for the purpose of identifying potential treatments. They should not, however, be viewed as a replacement technology for better controlled, more thoroughly researched extended functional analyses. As with any assessment approach, validity is best established through the results of treatments based on the assessment results. These brief assessments identify specific classes of treatment, and studies of the effectiveness of these treatments are now needed to validate the assessments further.

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